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### Description

**Use of deterative substances selected from the group of N-acylamino acids and the salts of N-acylamino acids for enhancing the compatibility of cosmetic or dermatological cleansing preparations**

*Insa*  
The present invention relates to the use of substances known per se as mild surfactants in cosmetic or dermatological cleansing compositions. The latter essentially comprise surface-active substances or mixtures of substances which are offered to the consumer in various preparations.

Examples of such preparations include foam baths and shower preparations, solid and liquid soaps or what are known as "syndets" (synthetic detergents), shampoos, handwashing pastes, personal hygiene compositions, special cleaning products for young children, and the like.

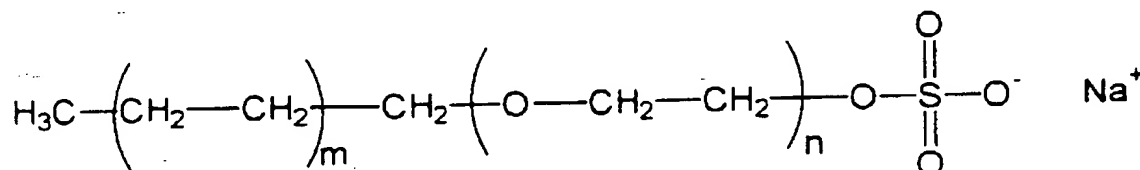
Surface-active substances – the best known being the alkali metal salts of the higher fatty acids, i.e., the classic "soaps" – are amphiphilic substances which are able to emulsify organic nonpolar substances in water.

These substances not only flush dirt from the skin and hair but also irritate skin and mucous membranes to a greater or lesser extent, depending on the choice of surfactant or surfactant mixture.

One of the surfactants used most commonly throughout the world for cosmetic compositions is sodium lauryl ether sulfate. Although per se an excellent deterative agent with good foaming ability, at higher concentrations it has an irritant effect on skin and mucous membranes.

As recent investigations show, the irritant potential of sodium lauryl ether sulfate is promoted at least in part by the fact that this substance binds to the surface of the skin, where it forms a certain reservoir. Studies suggest that the lauryl ether sulfate migrates from this reservoir into deeper layers of the skin, where it may then enter into uncontrolled secondary reactions, which harbor an increased risk of irritation.

The commercially customary sodium lauryl ether sulfate (i.e., sodium polyoxyethylene lauryl sulfate; by the INCI nomenclature: "sodium laureth sulfate"; CAS No. 1335-72-4), like the majority of raw materials used in cosmetics, is not a pure substance but rather, depending on its preparation, is a mixture of substances whose structures conform to the general formula



where n assumes numbers from 0 to 10 and m assumes numbers from 4 to 6. In the lauryl derivative which predominates in the commercial products and gives them their name, m is 5. Examples of commercial products are Texapon® N 25, Texapon® N 40, Texapon® N 70 and Texapon® N 103 from Henkel KGaA.

There are, however, also other lauryl ether sulfates having as their counterion, for example, ammonium ions unsubstituted or else substituted by alkyl groups or hydroxyalkyl groups, and also magnesium and the like.

Owing to its ready availability, acceptable price and excellent washing properties, however, it is impossible in practice, for the foreseeable future, to dispense entirely with sodium lauryl ether sulfate. Although preparations free from lauryl ether sulfate are known and are entirely advantageous, they nevertheless have other performance- or preparation-related or economic disadvantages.

It is known per se to use sodium lauryl ether sulfate in combination with other surfactants as a detergent agent. The skilled worker, wishing to enhance the skin compatibility of such preparations, then replaces some of the sodium lauryl ether sulfate with milder surfactants. However, unwanted side effects which generally have to be accepted are a reduction in foaming and/or in the cleansing performance. The aim was therefore to remedy this shortcoming.

The present invention relates, in one particular embodiment, to cleansing preparations for use as shower products.

Preparations of this kind as well are known per se. They essentially comprise surface-active substances or mixtures of substances, which are offered to the

consumer in various preparations. A general feature of such preparations is a more or less high water content, although they may also be present, for example, as concentrates.

Even simple bathing in water without the addition of surfactants is initially accompanied by swelling of the horny layer of the skin, the degree of said swelling being dependent, for example, on the duration of bathing and its temperature. At the same time, water-soluble substances, e.g., water-soluble dirt constituents, but also substances intrinsic to the skin, which are responsible for the water-binding capacity of the horny layer, are washed off or out. In addition, as a result of surface-active substances intrinsic to the skin, cutaneous fats are also dissolved and washed out to a certain extent. Following initial swelling, this causes subsequent significant drying of the skin, an effect which may be further intensified by deterative additives.

In the case of healthy skin, these processes are generally of no consequence, since the protective mechanisms of the skin are readily able to compensate for such slight disturbances to the upper layers of the skin. However, in the case even of nonpathological deviations from the normal state, e.g., as a result of environment-related wear damage or irritation, photo damage, aging skin, etc., the protective mechanism of the skin surface is impaired. In some circumstances, said mechanism is then no longer able to fulfill its function of itself, and has to be regenerated by means of external measures.

It was therefore an object of the present invention to remedy this deficiency in the prior art. A further object of the invention was to provide bath or shower preparations which on the one hand effect a high level of care without, on the other hand, leaving behind the cleansing effect.

The present invention additionally relates to deterative preparations of hair cosmetology, more commonly referred to as shampoos. In particular, the present invention relates to combinations of active cosmetic substances for the hair, and to haircare and scalpcare preparations.

Surprisingly, all of these objects are achieved by means of deterative cosmetic or dermatological preparations comprising:

- (a) more than 9.0% by weight of lauryl ether sulfate,
- (b) one or more anionic surfactants selected from the group of N-acylamino acids and their salts,

- (c) less than 5.0% by weight of inorganic salts.

These objects are achieved in particular by means of deterative cosmetic or dermatological preparations comprising:

- (a) more than 9.0% by weight of lauryl ether sulfate,
- (b) more than 0.5% by weight, preferably more than 1.0% by weight, in particular more than 2.0% by weight, very particularly more than 3.0% by weight, of one or more anionic surfactants selected from the group of N-acylamino acids and their salts,
- (c) less than 5.0% by weight of inorganic salts.

The present invention further provides for the use of one or more anionic surfactants selected from the group of N-acylamino acids and their salts for preventing or reducing the attachment of lauryl ether sulfate to human skin during the washing process.

The present invention further provides for the use of one or more anionic surfactants selected from the group of N-acylamino acids and their salts for fully or partly desorbing lauryl ether sulfate from human skin.

The present invention further provides for the use of one or more surfactants selected from the group of N-acylamino acids and their salts, said surfactant or surfactants being present in deterative cosmetic or dermatological preparations at concentrations of more than 3.0% by weight, based on the overall weight of the formulations, for reducing the attachment of lauryl ether sulfate to human skin during the washing process or for removing lauryl ether sulfate from human skin.

The present invention further provides for the use of one or more anionic surfactants selected from the group of N-acylamino acids and their salts for reducing the attachment of lauryl ether sulfate to human skin during the washing process, especially when the sodium lauryl ether sulfate is present in deterative cosmetic or dermatological preparations at concentrations of more than 9.0% by weight, based on the overall weight of the preparations.

It is known per se that N-acylamino acids and their salts are mild surfactants with a useful foaming action and good washing action (H.P. Fiedler, Lexikon der Hilfsstoffe für Pharmazie, Kosmetik und angrenzende Gebiete, 4th edition, p. 108, entry "N-Acylglutaminsäure" [N-acylglutamic acid]).

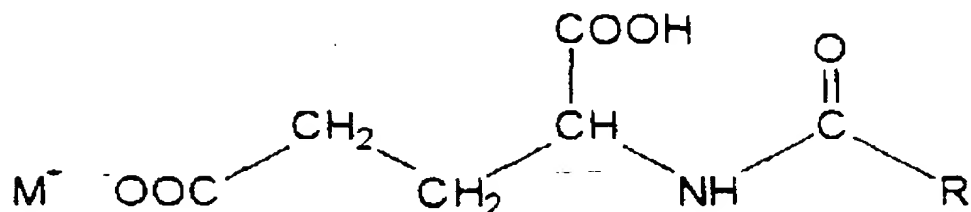
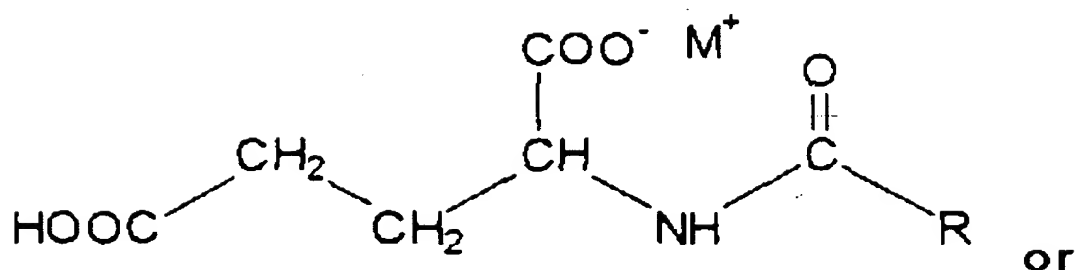
The document "Surface Active N-Acylglutamate: Preparation of Long Chain N-Acylglutamic Acid" (M. Takehara, I. Yoshimura, K. Takizawa, R. Yoshida; Journal of the American Oil Chemists' Society, vol. 49, p. 157 ff.) cites the JP patent 29 444 (1964), according to which acylglutamates have a moderating effect on instances of skin irritation brought about by other anionic surfactants such as sodium alkylbenzenesulfonates and sodium lauryl sulfate.

DE-A 43 04 066 describes a preparation comprising 12% by weight sodium lauryl ether sulfate and 3% by weight sodium cocoylglutamate. That document, however, relates to the use of electrolytes to prevent the penetration of the surface-active substances present in the cleansers, and/or other substances present in these cleansers, into the outer layers of the skin – the abovementioned preparation also contains 8% by weight sodium chloride, to whose presence the skilled worker attributes the reduction in the irritation potential of the sodium lauryl ether sulfate.

The acylamino acids (including, for the purposes of the present disclosure, the acyl peptides) and/or their salts may be chosen advantageously from the group consisting of

1. acylglutamates, examples being sodium acylglutamate, di-TEA-palmitoylaspartate and sodium caprylyl/caprylglutamate,
2. acyl peptides, examples being palmitoyl-hydrolyzed milk protein, sodium cocoyl-hydrolyzed soya protein and sodium/potassium cocoyl-hydrolyzed collagen,
3. sarcosinates, examples being myristoylsarcosine, TEA lauroylsarcosinate, sodium lauroylsarcosinate and sodium cocoylsarcosinate,
4. taurates, examples being sodium lauroyltaurate and sodium methylcocoyltaurate,
5. acyllysines, an example being lauroyllysine,
6. acylalaninates
7. acylglycinates

In the context of the present invention it is particularly advantageous to use acylglutamic acid and acylglutamates as the acylamino acid and/or salts thereof, respectively, especially sodium acylglutamates, which are characterized by the following structures:



or

Among the sodium acylglutamates, in turn, sodium cocoylglutamate, sodium lauroylglutamate, sodium myristoylglutamate, sodium stearylglutamate and sodium tallowylglutamate have proven particularly advantageous.

In accordance with the invention, and besides the abovementioned surfactants, the compositions may comprise the additives customary in cosmetology, examples being fragrance, dyes, antimicrobial substances, refatting agents, complexing agents and sequesterants, pearl luster agents, plant extracts, vitamins, active substances, preservatives, bactericides, pigments having a coloring action, thickeners, emollients, moisturizers and/or humectants, fats, oils, waxes or other customary constituents of a cosmetic or dermatological formulation, such as alcohols, polyols, polymers, foam stabilizers, electrolytes, organic solvents or silicone derivatives.

The examples which follow are intended to illustrate the present invention without restricting it. Unless stated otherwise, all amounts, proportions and percentages are by weight, based on the weight and the total amount, or on the total weight, of the preparations.

#### **Example 1**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	48.00
Cocoamidopropylbetaine (33% strength solution)	5.00
Sodium cocoylglutamate (25% strength solution)	5.00

PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

### **Example 2**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	40.00
Cocoamidopropylbetaine (33% strength solution)	10.00
Sodium cocoylglutamate (25% strength solution)	3.00
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

### **Example 3**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	30.00
Cocoamidopropylbetaine (33% strength solution)	15.00
Sodium cocoylglutamate (25% strength solution)	1.00
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

### **Example 4**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	43.00
Cocoamidopropylbetaine (33% strength solution)	11.00

Sodium cocoylglutamate (25% strength solution)	4.50
Decyl glucoside (50% strength solution)	2.00
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

#### **Example 5**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	35.00
Cocoamidopropylbetaine (33% strength solution)	8.00
Sodium cocoylglutamate (25% strength solution)	3.00
Decyl glucoside (50% strength solution)	4.00
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

#### **Example 6**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	25.00
Cocoamidopropylbetaine (33% strength solution)	14.00
Sodium cocoylglutamate (25% strength solution)	2.00
Decyl glucoside (50% strength solution)	3.00
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00



**Example 7**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	47.00
Sodium cocoamphoacetate (36% strength solution)	9.00
Sodium cocoylglutamate (25% strength solution)	6.00
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

**Example 8**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	41.00
Sodium cocoamphoacetate (36% strength solution)	6.50
Sodium cocoylglutamate (25% strength solution)	3.50
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

**Example 9**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	41.00
Sodium cocoamphoacetate (36% strength solution)	6.50
Sodium lauroylglutamate (25% strength solution)	3.50
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

**Example 10**

	% by weight
Sodium laureth sulfate (27.5% strength solution)	32.00
Sodium cocoamphoacetate (36% strength solution)	5.00
Sodium cocoylglutamate (25% strength solution)	5.00
PEG-40 hydrogenated castor oil	0.50
PEG-100 hydrogenated glyceryl palmitate	0.50
Sodium benzoate	0.45
Sodium salicylate	0.20
Citric acid	0.50
Perfume	q.s.
Water	ad 100.00

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